longitude and declination will be most readily deduced. The formula is exemplified by calculations and results of the diurnal variation of magnetic declination for each month at the various Colonial Observatories, and also of the temperature at the Cape, St. Helena, Hobarton, Toronto, Greenwich, Leith, and Melville Island. The author infers *that the temperatures taken at six-hourly intervals give for their sum four times the mean temperature of the day, whatever be the commencing hour*; and thus travellers and voyagers observing at 5^h, 11^h, 17^h and 23^h, will get the mean temperature of their position at 2 P.M. Hence, from the communications of the captains of Merchantmen, the Atlantic oceanic temperatures might be mapped in the course of a year, and the isothermal curves on this broad level surface be accurately laid down (see Journ. R. Geograph. Soc. ix. p. 369). Excepting at Melville Island, R_1 is the greatest coefficient, ψ_1 is nearly constant, and

$$H+\Sigma_1^4 R_i \sin(it+\psi_i)+\cos 8t \cos 2t(F \sin t+G \cos t)$$

will give the *yearly* formula: the homonymous hours are expressed by $H+\Sigma_1^2 R_i \sin(it+\psi_i)$ as in the oceanic tides nearly. At Melville Island, $\psi_3=45°$ nearly and R_3 is the greatest. The semester from midwinter to midsummer is also nearly expressed by

$$P+Q \sin \odot \text{ long. for } R_1.$$

Having obtained the empirical R and ψ, or A and a, any theoretic formula can be tested by the results.

April 29, 1852.

The EARL OF ROSSE, President, in the Chair.

The following communications were read:—

1. "Notes on the Impregnation of the Ovum in the Amphibia:" in a Letter to Thomas Bell, Esq., Sec. R.S. Communicated by Mr. Bell. Received April 27, 1852.

April 27, 1852.

MY DEAR MR. BELL,—During the month of March, now past, and since an abstract of my *Second Series* of observations "On the Impregnation of the Ovum in the Amphibia" has appeared in the Proceedings of the Royal Society for June 1851, I have ascertained that the spermatozoa of the Frog are not only brought into contact with the surface of the egg, in fecundation, as already known, but that some of these bodies penetrate into the thick gelatinous envelopes, as stated by Prevost and Dumas: and further, I have found that in those eggs which are completely fecundated, some spermatozoa have arrived at, and become partially imbedded in the internal envelope which encloses the yelk, although I have not yet been able to detect any within the yelk itself; nor have obtained any evidence of the existence of an orifice, or natural perforation in the external envelopes, through which these bodies might enter.

It is right that I should make this announcement without further delay, as the fact now mentioned necessitates some revision of my view respecting the nature of the impregnating influence, as expressed in the paper alluded to. This I propose to make, and to lay very soon before the Royal Society.

I remain, my dear Sir,
Yours very faithfully,
Thos. Bell, Esq., Sec. R.S. GEORGE NEWPORT.

2. "Further Experiments on Light." By Henry Lord Brougham, F.R.S., Member of the Institute of France, and of the Royal Academy of Sciences of Naples. Received March 5, 1852.

The author commences this account of his experiments by remarking, that "it is probable that some may consider the inference to be drawn from the following experiments as unfavourable to the doctrines of my former paper—I think I can explain the phenomena according to those doctrines—but be they ever so repugnant, we are of course in search of truth, and have no right even to wish that the balance may incline one way rather than another, far less to conceal any facts which may affect its inclination."

The leading experiment is this:—A speculum is placed in a beam of light and is inclined so that the reflected rays shall make a small angle with the surfaces. Near the speculum the axis of reflected rays coincides with that of the direct rays, but at a greater distance the two discs are separate. The speculum being placed horizontally across the pencil, coloured fringes appear both on the upper and lower side of the reflected disc. These two sets of fringes are alike in their colours and in the order of their colours, but the upper fringes are narrower than the lower, and they diminish in breadth with their distance from the disc, while the lower ones increase in breadth with their distance. If only one edge of the speculum is in the pencil there are only fringes on one side of the disc.

It appears that the breadth of the fringes is in some inverse proportion to the breadth of the speculum. When the speculum is a triangle with a very acute angle, the broadest fringes, and those most removed from the disc, answer to the points of the speculum where it is narrowest, and they increase regularly towards the point which answers to the acute angle or apex of the speculum. Their form is hyperbolic.

When the edges of the speculum are parallel, the disc near to it is filled with groups of fringes which vary in number, in breadth and in colour, at all the distances from the speculum. At one distance they form only a dark line running through the disc, and this is deep purple when examined closely. At a greater distance the fringes have other colours, and become broader again; and at a still greater distance they emerge into the shadow on both sides of the disc.

The phenomena of reflexion, it is stated, closely resemble those of flexion, as to the fringes, their colours, their magnitude, their variation at different distances from the bending edges, and at different distances of those edges from each other.